Rhodora

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RHODORA.— **A monthly journal of botany, evoted primarily to the flora of New England. Price, *$1.50* per year (domestic and foreign); single copies 15 cents. Prices of Volumes 1 and 2 (1899 and 1900) on application. All remittances by check or draft, except on Boston or New York, must include ten cents additional for cost of collection. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.**

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.— NEW SERIES, NO. XLIV.

THE GENUS EUPHRASIA IN NORTH AMERICA.

M. L. Fernald and K. M. Wiegand.

Although furnishing by their bright flowers much of the late-summer coloring of open habitats in eastern and northern New England and the more northerly regions, the Eyebrights seem to have attracted little notice in American botany until the past two decades. Michaux collected the characteristic species (*Euphrasia canadensis*) of the region of the city of Quebec on July 21, 1792; but it appeared in his *Flora* without statement of locality and under the indefinite name *Euphrasia officinalis* L. Pursh treated the Michaux plant as *E. officinalis* and also recorded a Labrador plant which he supposed to be Willdenow's *E. latifolia*. Other early American botanists apparently did not know of the genus *Euphrasia* in America; or such rare specimens as reached herbaria were treated as *E. officinalis* or varieties of it.

The first record of a *Euphrasia* in the United States seems to have been by William Oakes, who in 1847 listed as *E. officinalis* the little alpine plant which has subsequently been named *E. Oakesii* and added the significant note: "Stem dwarf, simple; leaves roundish, with obtuse teeth; flowers very pale, and extremely minute. It is probably E. micrantha *Reichenbach*, Fl. Exc. p. 358.... In the alpine region of the White Mountains. 1844." [1] In the 1st edition of Gray's *Manual* Oakes's White Mountain plant appeared as *E. officinalis*, but with the

[1] Oakes in Hovey's Mag. xiii. 217, 218 (1847).

added note that it is "a dwarf variety, 1′–5′ high, with very small flowers." [1] In the 2nd edition, however, Dr. Gray augmented the statement by adding to the White Mountain record "L. Superior, and northward" and by stating that the American "variety" is "E. pusilla, *Godet, mss.*" [2] Godet seems, though, never to have published his *E. pusilla*, although in a letter to Gray, under date of March 1, 1854, he wrote: "Votre *Euphrasia officinalis alpina* (White Mountains, Coll. Oakes) est une espèce parfaitement distincte de notre plante. Je l'ai nommée *E. pusilla* dans mon herbier." That Godet also named another species in his herbarium *E. pusilla* is indicated by the fact that, in his *Monographie der Gattung Euphrasia*, Wettstein cites the herbarium-name *E. pusilla* Godet as a synonym of *E. arctica* Lange (*E. latifolia* Pursh, as to the Labrador plant); while the Lake Superior plant of Gray's 2nd edition, where the name *E. pusilla* was published, was also *E. arctica;* and the plants known to Gray from "northward" were partly *E. arctica*, partly at least two other species, *E. canadensis* Townsend and *E. disjuncta* Fernald & Wiegand. The name *E. pusilla*, therefore, has not a clear signification nor did the publication of it by Gray in a somewhat incidental manner as having been applied to a "variety" of *E. officinalis* give it the standing necessary for a specific name.

This treatment of *Euphrasia* in temperate eastern America was carried unchanged through the next three editions of the *Manual*, but in the *Synoptical Flora* Gray treated some of the common plants of the coast of eastern Maine and adjacent Canada (*E. americana* and *E. stricta*) as *E. officinalis*, "perhaps introduced from Europe"; [3] while the plants known to Gray from the alpine region of the White Mountains (*E. Oakesii*), the shore of Lake Superior (*E. arctica*), the northern Rocky Mountains (*E. disjuncta*), the Aleutian Islands (*E. mollis*) and "far northward" (*E. disjuncta, E. arctica*, etc.) were treated as var. *tatarica*, a plant known to the writers only from Eurasia and from the eastern counties of Quebec. This interpretation was followed by Watson & Coulter in the 6th edition of Gray's *Manual;* and, except that in 1873 Reeks, in an obscure publication upon Newfoundland, had published a new *E. purpurea*,[4] overlooked by the

[1] Gray, Man. 309 (1848).
[2] Gray, Man. ed. 2, 295 (1856).
[3] Gray, Syn. Fl. ii. pt. 1, 305 (1878).
[4] Reeks, List of Fl. Pl. and Ferns of Newfoundland, 4 (1873).

editors of *Index Kewensis* and by recent students of the genus, it was not until the appearance of Wettstein's *Monographie* in 1896 that it was recognized that in North America *Euphrasia* consists of several distinct species, most of them not satisfactorily referable to Old World species.

Wettstein definitely recognized in North America *E. americana* Wettstein, *E. latifolia* Pursh, in part (*E. arctica* Lange), *E. mollis* Ledeb., *E. Oakesii* Wettstein, *E. Rostkoviana* Hayne and, with doubt, *E. hirtella* Jordan. In 1898 Townsend added *E. canadensis* [1] (presumably including the Quebec plant which had been the basis of Wettstein's record of *E. Rostkoviana,* a well marked species not subsequently credited to North America); and in 1901, Robinson,[2] summarizing the knowledge of the American species at that time, recognized seven species and two varieties: *E. mollis, E. Oakesii, E. Williamsii* Robinson, *E. Randii* Robinson, *E. Randii,* var. (?) *Farlowii* Robinson, *E. latifolia, E. hirtella, E. americana,* and *E. americana,* var. *canadensis* (Townsend) Robinson.

In subsequent publications, for instance in the 7th edition of Gray's *Manual,* Robinson's treatment has been only slightly modified; but explorations to the northeast of the Manual range have recently brought together so much additional material of the genus that it has seemed advisable to present a new study of the Eyebrights based upon a somewhat extended field-knowledge of the plants and a prolonged herbarium-study; and, although the present summary of our knowledge necessarily leaves for further consideration some problematic plants of which we have inadequate material, it may prove useful as a fresh basis for further study of the genus.

Synopsis of North American Species and Varieties of Euphrasia.

A. Upper lip of corolla very shallowly bilobed; the lobes very short, rounded, entire, narrowly revolute, rarely erect: lower lip scarcely fan-shaped, not exceeding the upper: flowers very small, 2.2–4 (rarely 4.8) mm. long: bracts with blunt teeth. B.

B. Inflorescence capitate or subcapitate, the flowers closely crowded, only the 1–4 lowest pairs of bracts becoming slightly remote in maturity. C.

C. Corolla whitish to lilac: nodes below the head 2–5: leaves pubescent.....1. *E. Oakesii.*

[1] Townsend, Journ. Bot. xxxvi. 1, t. 381 (1898).

[2] Robinson, Rhodora, iii. 270–276 (1901).

C. Corolla deep brownish-purple or chocolate-color: nodes below the head 4–9.
Leaves glabrous: nodes below the head 4–7.....2. *E. Williamsii.*
Leaves pubescent: nodes below the head 5–9.
(2.) *E. Williamsii*, var. *vestita.*

B. Inflorescence becoming loose and elongate, flowers or capsules scattered, the mature spike with many remote bracts. D.

D. Leaves glabrous on both surfaces: corolla deep purple to cream-color.....3. *E. purpurea.*

D. Leaves pubescent on both surfaces.
Leaves sparingly crisp-pubescent on both surfaces, the primary ones 5–18 mm. long: corolla deep purple (rarely whitish) with dark lines.....(3.) *E. purpurea*, var. *Randii.*
Leaves very densely pubescent, the primary ones 2–7 mm. long: corolla whitish (rarely purple).
(3.) *E. purpurea*, var. *Farlowii.*

A. Upper lip of corolla plainly bilobed; the lobes somewhat reflexed from the base (not revolute), truncate, and from undulate to coarsely 3-toothed: lower lip in larger forms fan-shaped, spreading and very conspicuous: flowers rather large, 4–10 mm. long: bracts with acute or acuminate, rarely obtuse, teeth. E.

E. Bracts with acute or obtuse teeth: leaves pubescent. F.

F. Inflorescence nearly capitate, in maturity with the 1–3 lower pairs of bracts remote: teeth of bracts obtuse: leaves very pubescent: corolla 5–6 mm. long.....4. *E. mollis.*

F. Inflorescence spicate, becoming loose and elongate: teeth of bracts acute: leaves very pubescent to almost glabrous.
Internodes long: inflorescence open, the lowest bracts in maturity 2–5 cm. apart: bracts spreading: corolla 4–5.5(–6) mm. long 5. *E. disjuncta.*
Internodes short: inflorescence dense above, the lowest bracts in maturity 0.5–2 cm. apart: bracts ascending: corolla 5–7 mm. long 6. *E. arctica*

E. Bracts with subulate or bristle-tipped teeth: leaves pubescent or glabrous. G.

G. Spikes comprising the larger portion of the plant, beginning near the base of the stem and branches. H.

H. Corolla 5–6.5 mm. long, with pale-lavender or bluish lines; the lower lip with the lateral lobes not strongly spreading.
Bracts oblong, pubescent: branches strongly ascending. 7. *E. hudsoniana.*
Bracts orbicular or broadly oval, glabrous: branches arcuate-ascending.....8. *E. canadensis.*

H. Corolla 6–8 mm. long. with dark-purple lines; the lower lip with wide-spreading lateral lobes.
Bracts glabrous.....9. *E. stricta.*
Bracts pubescent.....(9.) *E. stricta*, var *tatarica.*

G. Spikes occupying only the upper half or third of the stem and branches: corolla large, 7–9 mm. long, with dark-purple lines; lower lip with wide-spreading lateral lobes.....10. *E. americana.*

1. E. Oakesii Wettstein, Monog. d. Gatt. Euphrasia, 142, t. 4. figs. 211–215, t. 12, fig. 6 (1896) and Bot. Gaz. xxii. 401 (1896); Britton & Brown, Ill. Fl. iii. 182, fig. 3327 (1898); Fernald, Rhodora, iii. 176 (1901); Robinson, ibid. 272 (1901); Eggleston, Rhodora, iv. 108 (1902); Fernald, Rhodora, ix. 163 (1907); Robinson & Fernald in Gray, Man. ed. 7, 733 (1908). *E. officinalis* Oakes in Hovey's Mag. xiii. 217 (1847); Gray, Man. 309 (1848) as to the Oakes plant; J. I. & A. B. Northrop, Bull. Torr. Bot. Cl. xvii. 27 (1890), in part. *E. pusilla* Godet acc. to Gray, Man. ed. 2, 295 (1856), as to the Oakes plant. *E. officinalis*, var. *tatarica* Wats. & Coult. in Gray, Man. ed. 6, 392 (1890), in part, not Benth. *E. orbicularis* Townsend acc. to Wettst. l. c. 143 (1896). *E. albimontana* Boiss. acc. to Wettst. l. c. (1896.)— Low, often very dwarf, 2–8 (rarely –12) cm. high, usually unbranched: stem crisp-pubescent: leaves 2–5 pairs below the inflorescence, smaller than the bracts, 1.5–7 mm. long, ovate to orbicular, crisp-pubescent on both faces: bracts similar in shape, with rounded teeth: inflorescence at first distinctly capitate, in maturity globose to ellipsoid, 0.5–2.5 cm. long, at most with the 1 or 2 lowest pairs of bracts becoming slightly remote: corolla 2.5–3.3 mm. long, whitish, with violet lines; upper lip shallowly bidentate, with narrow revolute entire margins; lower lip with oblong bidentulate lobes; throat yellow.— Exposed crests and bleak mountain summits, Labrador, Maine and New Hampshire. Labrador: on rocks, north shore of Battle Harbor, August 6–13, 1911, *C. S. Williamson*, no. 713. Maine: wet shelves and crevices, 1220–1375 m. altitude, north and west walls of North Basin, Mt. Katahdin, July 13–14, 1900, *Williams & Fernald.* New Hampshire: "in alpinis Montium Alborum," 1844, *Wm. Oakes;* gravelly plains, summits of White Mountains, August 16 and 28, 1877, *C. G. Pringle;* White Mountains, August 9, 1881, *W. H. Manning*; Crawford Path at Mt. Monroe, August 28, 1877, August 5, 1879, August 15, 1881, September 13, 1891, and July 8 and 31, 1893, *E. & C. E. Faxon*, August 15–20, 1898, *W. W. Eggleston*, August 4, 1901, *E. F. Williams*; open shaly ground, head of Oakes Gulf, August 4, 1901, *E. F. Williams & B. L. Robinson*, Pl. Exsicc. Gray., no. 61; Oakes Gulf, about 1375 m., August 17–24, 1901, *W. W. Eggleston*, no. 2408; edge of Oakes Gulf, August 14, 1902, *A. S. Pease.*

1a. Forma **lilacina**, n. f., corollae lobis valde lilacinis.

Lobes of the corolla deep lilac.— Labrador: exposed crests of limestone and calcareous sandstone terraces, Blanc Sablon, August 6, 1910, *Fernald & Wiegand*, no. 3988 (type in Gray Herb.).

2. E. Williamsii Robinson, Rhodora, iii. 272 (1901); Fernald, Rhodora, ix. 163 (1907); Robinson & Fernald in Gray, Man. ed. 7,

733 (1908); Britton & Brown, Ill. Fl. ed. 2, iii. 218 (1913).— Plant simple or sparingly branched, 3–12 cm. high: stem pubescent: leaves 4–7 pairs below the inflorescence, 2–9 mm. long, glabrous on both surfaces: inflorescence at first capitate, in maturity cylindric, 0.7–5 cm. long, usually with only the 1–4 lowest pairs of bracts becoming a little remote: bracts similar to and only slightly larger than the leaves, with obtuse teeth: corolla 2.5–4 mm. long, deep brownish-purple, similar in size and shape to that of *E. Oakesii*.— Barren ledges, alpine region of Mt. Washington, New Hampshire. New Hampshire: Cape Horn, Mt. Washington, August 6, 1896 and August 5, 1901, *E. F. Williams;* ledges near 5th Mile Post, Mt. Washington, August 6, 1896, *E. & C. E. Faxon*, September 12, 1904, and August 19, 1907, *A. S. Pease*, nos. 4107 and 10,595; stony ground and crevices of rocks, "Alpine Garden," Mt. Washington, August 5, 1901, *E. F. Williams & B. L. Robinson*, Pl. Exsicc. Gray, no. 60; Lion's Head, Mt. Washington, August 28, 1909, *A. S. Pease*, no. 12,527.

Very close to *E. Oakesii* but differing in the usually larger stature, with the more numerous cauline leaves only slightly smaller than the bracts; in the usually remote lower bracts; and in the deep chocolate-color of the corolla. In this species, as in several others, there is a glabrous and a pubescent trend: the former the typical plant of New Hampshire, the latter an alpine plant of Newfoundland.

2a. E. Williamsii, var. **vestita**, n. var., foliis pubescentibus, pilis crispis; nodiis infra inflorescentiam 5–9; bracteae dentibus plerumque acutiusculis.

Leaves crisp-pubescent, 5–9 pairs below the inflorescence: teeth of the bracts mostly acutish.— Newfoundland: dry diorite peak, Lookout Mountain, Bonne Bay, August 26, 1910, *Fernald & Wiegand*, no. 4009 (type in Gray Herb.); dry exposed thin soil on summit-ledges altitude 335–520 m., Blomidon, July 31 and August 7, 1908, *Eames & Godfrey*, nos. 8068 and 8069.

3. E. purpurea Reeks, List of Fl. Pl. and Ferns of Newfoundland, 4 (1873).— Simple or usually branched from near the base, 0.3–4 dm. high: stems crisp-pubescent: leaves glabrous or nearly so on both surfaces, with glabrous or ciliate margins, ovate-oblong to nearly orbicular, the primary ones 5–15 (rarely –18) mm. long; teeth from rounded to barely acute: bracts similar: inflorescences becoming very elongate; the primary one $\frac{1}{2}$–$\frac{3}{4}$ the full height of the plant, with 10–20 somewhat remote pairs of bracts; the lower bracts about one-half as long as the internodes: corollas 2.5–4 mm. long, from deep to pale purple with darker lines; throat usually with a yellow spot; upper lip shallowly notched, with revolute or rarely erect entire or bidentulate lobes; lower lip not distinctly fan-shaped, with ascending truncate or bidentulate linear or oblong lobes.— Grassy or peaty banks and brackish shores, western Newfoundland and eastern Quebec

to southern New Brunswick. NEWFOUNDLAND: damp shores, Port Saunders, August 6, 1910, *Fernald, Wiegand & Kittredge,* no. 3995; bog back of the strand, Cow Head (Reeks's type locality), July 22, 1910, *Fernald & Wiegand,* no. 3985; rocks and gravelly strand, Southeast Arm of Bonne Bay, August 31, 1910, *Fernald & Wiegand,* nos. 4006, 4007; moist banks in deep shade and in dry fields, near sea level, Bay of Islands, July 27 and 28, 1908, *Eames & Godfrey,* no. 8070; damp thicket, Bay St. George, August 5–7, 1901, *Howe & Lang,* no. 996; open bog in wet woods overlying carboniferous sandstone, Stephenville, August 15, 1910, *Fernald, Wiegand & Kittredge,* no. 3996; damp sandy shores, St. George's, August 13, 1910, *Fernald, Wiegand & Kittredge,* no. 3992; grassy shores, Port à Port, August 15, 1910, *Fernald, Wiegand & Kittredge,* no. 4003. QUEBEC: edge of brackish marsh, Pointe au Maurier, Canton Charnay, Saguenay County, August 26, 1915, *St. John;* turfy bank, La Grande Romaine, Canton Lagorgendière, Saguenay County, September 2, 1915, *St. John;* knolls in salt marsh, St. John (or Douglastown) River, August 23, 1904, *Collins, Fernald & Pease;* border of brackish marsh, Barachois de Malbaie, August 13, 1907, *Fernald,* no. 1168. MAGDALEN ISLANDS:[1] boggy margin of the strand at the Narrows, Alright Island, August 21, 1912, *Fernald, Long & St. John,* no. 8021; border of brackish marsh near Hospital Point, Grindstone Island, July 18, 1912, *Fernald, Bartram, Long & St. John,* no. 8017; knolls in the marsh at the border of a brackish pond, and on dry turfy crests of a sandstone sea-cliff, southwest of Étang du Nord village, Grindstone Island, August 15, 1912, *Fernald, Long & St. John,* nos. 8019, 8020; grassy bank near shore, Amherst Island, August 25, 1914, *St. John,* no. 1646. PRINCE EDWARD ISLAND: in grass upon damp brackish sands, Cape Aylesbury, August 29, 1912, *Fernald, Long & St. John,* no. 8022. NOVA SCOTIA: Bay St. Lawrence, Cape Breton Island, August 14, 1904, *J. R. Churchill.* NEW BRUNSWICK: along the sea-coast, Petitcodiac, August, 1884, *J. Britain,* Herb. Geol. Surv. Can. no. 17,438.

3a. E. PURPUREA, forma **candida**, n. f., corollae lobis albicantibus.

Lobes of the corolla whitish.— QUEBEC: on anorthosite, east side of Great Basque, Seven Islands, August 15, 1907, *C. B. Robinson,* no. 943. MAGDALEN ISLANDS: knolls at border of brackish marsh, East Cape, Coffin Island, July 19, 1912, *Fernald, Bartram, Long & St. John,* no. 8018 (TYPE in Gray Herb.).

Forma *candida* seems closely to match material distributed by Birger as *E. bottnica* Kihlm. in Wettst., l. c. 299 (1896) from Sweden. If the pale-flowered *E. bottnica* of Scandinavia and *E. purpurea,* forma *candida* of northeastern America prove to be identical, we should

[1] Although at present belonging politically to Gaspé County, Quebec, the Magdalen Islands are so remote that they are here treated as a distinct geographic area.

naturally expect the more common American plant with purple flowers to be found in Scandinavia.

3b. E. PURPUREA, var. **Randii** (Robinson), n. comb. *E. officinalis*, form, Rand & Redfield, Fl. Mount Desert, 133 (1894). *E. Randii* Robinson, RHODORA, iii. 273 (1901); Kennedy, RHODORA, iv. 26 (1902); Robinson & Fernald in Gray, Man. ed. 7, 733 (1908); Cushman, RHODORA, xi. 13 (1909); Fernald & Wiegand, RHODORA, xii. 105 and 143 (1910); Britton & Brown, Ill. Fl. ed. 2, iii. 218, fig. 3842 (1913); Knowlton, RHODORA, xvii. 148 (1915).— Leaves and bracts sparingly crisp-pubescent on both surfaces.— Exposed turfy knolls, peaty crevices of sea-cliffs and borders of brackish marshes, Labrador to Gaspé Co., Quebec, and southward to the coast of Maine. LABRADOR: Cartwright, August 20, 1902, *Amos P. Brown* (herb. Phil. Acad.). QUEBEC: open sterile soil, western end of Bonaventure Island, August 7 and 8, 1907, *Fernald & Collins*, no. 1167. NOVA SCOTIA: on rocks, Englishtown, Cape Breton, August 2, 1898, *J. Macoun*, Herb. Geol. Surv. Can., no. 19,898; on rocks, Bell's Island, August 11, 1910, *J. Macoun*, Herb. Geol. Surv. Can., no. 80,663; in humus, edge of sea cliffs, Black Hole, Scott's Bay, August 24, 1902, *Fernald;* damp earth, Sable Island, July and August, 1899, *J. Macoun*, Herb. Geol. Surv. Can., nos. 22,557 and 22,557a; dune-hollow, Sable Island, August 21, 1913, *St. John*, no. 1319. NEW BRUNSWICK: Grand Manan Island, July 31, 1891, *J. R. Churchill.* MAINE: wooded crests of sea-cliffs, eastern side of Moose Island, Passamaquoddy Bay, August 16, 1909, *Fernald*, no. 2122; clay, gravel or humus, West Quoddy Head, Lubec, July 26 and August 2, 1909, *Fernald*, nos. 2120, 2121; in humus, Cutler, July 30, 1901, *G. G. Kennedy*, July 1–6, 1902, *Kennedy, Williams, Collins & Fernald*, July 12, 1902, *Kate Furbish*, August 27, 1902, *Fernald;* edge of sandy bluffs bordering ocean, Beal's Island, Jonesport, August 5, 1907, *Cushman & Sanford*, no. 1492; grassland and pastures, Great Cranberry Island, July 17, 1896, *E. L. Rand*, July 17, 1897 and July 20, 1899, *E. F. Williams & E. L. Rand;* grassy places, Great Duck Island, July 12, 1901, *E. L. Rand;* Baker Island, July 22, 1899, *E. L. Rand;* seawall, Southwest Harbor, July 26, 1892, *E. L. Rand;* East Brothers Island, July 31, 1904, *A. H. Norton;* North Libby Island, August 2, 1904, *A. H. Norton.*

3c. E. PURPUREA, var. RANDII, forma **albiflora**, n. f., corollae lobis albicantibus.

Lobes of the corolla whitish.— Eastern Newfoundland, Magdalen Islands and the coast of Maine from Penobscot Bay westward. NEWFOUNDLAND: border of salt marsh, Killigrew's, August 3, 1911, *Fernald & Wiegand*, no. 6164; crests of sea-cliffs, Western Head, New World Island, July 20, 1911, *Fernald, Wiegand & Bartram*, no. 6163. MAGDALEN ISLANDS: dry knolls, Brion Island, August 5, 1914, *St. John*, no. 1641. MAINE: turfy crests, Elwell Point, South

Thomaston, August 15, 1913, *Bissell, Fernald & Chamberlain* (*Fernald*, no. 10,404, TYPE in Gray Herb.); Dix Island (near Owl's Head), September, 1903, *Sheridan Plaisted;* Wooden Ball Island, August 24, 1905, *A. H. Norton.*

3d. E. PURPUREA, var. **Farlowii** (Robinson), n. comb. *E. Randii*, var. (?) *Farlowii* Robinson, RHODORA, iii. 274 (1901); Robinson & Fernald in Gray, Man. ed. 7, 733 (1908); Eames, RHODORA, xi. 98 (1909); Fernald & Wiegand, RHODORA, xii. 105 and 143 (1910).— Usually smaller than typical *E. purpurea* or var. *Randii*, 1–13 cm. high: leaves and bracts densely pubescent, mostly smaller, 2–7 mm. long, the flowers therefore appearing more conspicuous: corolla whitish; the lower lip somewhat more spreading; yellow spot in the throat smaller or wanting.— Exposed turfy crests or gravelly or sandy shores, Newfoundland and eastern Quebec to the eastern coast of Maine. NEWFOUNDLAND: top of dry sea-bluffs, Torbay, August 21–26, 1901, *Howe & Lang*, no. 1455; rocks by the sea, Placentia, July 20, 1911, *C. S. Williamson*, no. 490; Barred Islands, Notre Dame Bay, August 12, 1903, *J. D. Sornborger;* damp sand on pebbly tidal beach, Bay St. George, August 12, 1908, *Eames & Godfrey*, nos. 8066, 8067; damp sands, carboniferous area, Stephenville Crossing, August 14, 1910, *Fernald, Wiegand & Kittredge*, no. 3990. QUEBEC: grassy or mossy ledges, Isle Netagamiou, Archipelago of Petit Mécatina, Saguenay County, August 22 and 23 (form with purplish upper lip), 1915, *St. John*. MAGDALEN ISLANDS: dry knolls and sandy headlands, Brion Island, August 5 and 10, 1914, *St. John*, nos. 1642, 1647; dry turfy crests of a sandstone sea-cliff, southwest of Étang du Nord village, Grindstone Island, August 15, 1912, *Fernald, Long & St. John*, no. 8023. PRINCE EDWARD ISLAND: in grass, East Point, August 15, 1888, *J. Macoun*, Herb. Geol. Surv. Can., no. 17,439, in part. NOVA SCOTIA: on rocks, Englishtown, Cape Breton, August 2, 1898, *J. Macoun*, Herb. Geol. Surv. Can., no. 19,897; sea-cliffs, Neil's Harbor, July 28, 1909, *J. R. Churchill.* MAINE: open thin humus, Dog Island, Eastport, September, 1877, *W. G. Farlow*, August 3, 1909, *Fernald*, no. 2124; humus, West Quoddy Head, Lubec, July 26, 1909, *Fernald*, no. 2123; Jonesport, September 17, 1886, *N. T. Kidder.*

Fernald & Wiegand's no. 3991 from damp sand at Stephenville Crossing, Newfoundland, growing with no. 3990, is apparently this variety, though the flowers are larger (4 mm. long) and the fresh foliage had a characteristic lustrous bronze appearance which was very striking.

3e. E. PURPUREA, var. FARLOWII, forma **iodantha**, n. f., corollae lobis purpureis.

Lobes of the corolla purple.— MAINE: Matinicus Island, August 22, 1905, *A. H. Norton* (TYPE in Gray Herb.).

In its very small thick and densely pubescent leaves quite like var.

Farlowii, but with the deep-purple corolla of the glabrous *E. purpurea* and the sparingly pubescent var. *Randii*.

Euphrasia purpurea is our most variable species, in its more pronounced trends appearing like a number of species but without distinct concomitant characters. The characteristic purple corolla of typical *E. purpurea* and var. *Randii* is ordinarily a good character, but white-flowered forms of each are now known, thus breaking down a line of demarkation which was formerly used in distinguishing the very densely pubescent white-flowered var. *Farlowii*. The diagnostic value of the color of the corolla is now further put in doubt by the discovery by Mr. Norton of the Matinicus plant which in every other character matches extreme white-flowered var. *Farlowii* but which has the purple corolla of true *E. purpurea*. These extremes, although pronounced in the majority of colonies are, then, better treated as variants of one highly diversified species. It is noteworthy that true *E. purpurea* has its great development about the Gulf of St. Lawrence, where var. *Randii* is rare, and that it does not reach the Maine coast, where the latter is common; also that var. *Farlowii* is most abundant in Newfoundland, the Magdalen Islands and the Maritime Provinces but rare on the Maine coast.

4. E. MOLLIS (Ledeb.) Wettstein, Monog. d. Gatt. Euphrasia, 141, t. 4, fig. 205–210 and t. 12, fig. 5 (1896); Robinson, RHODORA, iii. 271 (1901). *E. officinalis*, var. *mollis* Ledeb. Fl. Ross. iii. 263 (1849).— Plant 4–10 cm. high, simple or occasionally with a pair of short spreading branches: leaves large for the size of the plant, 8–15 mm. long, ovate, coarsely crenate-dentate, copiously pubescent: inflorescence when young almost capitate, in maturity with the 1–3 lower pairs of bracts remote: bracts resembling the leaves: calyx densely pilose; its teeth barely acute: corolla scarcely overtopping the bracts, 5–6 mm. long, resembling that of *E. disjuncta* but deeper purple.— Grassy and sandy banks, Alaska, Islands of Bering Sea, and Kamtschatka. ALASKA: hillside, Akutan Island, August 21, 1907, *E. C. Van Dyke*, no. 95; other stations cited by Wettstein.

Very closely related to *E. disjuncta* and *E. arctica*, from both of which it differs in the more congested inflorescence, more copious pubescence, more rounded bracteal teeth, and more purple corolla. From *E. arctica* it also differs in its smaller corolla.

5. E. **disjuncta**, n. sp. *E. officinalis*, β Hook. Fl. Bor.-Am. ii. 106 (1838). *E. latifolia* Robinson, RHODORA, iii. 274 (1901), in part, perhaps also of Pursh in part. *E. hirtella* Robinson, l. c. 275 (1901), in part, not Jordan. *E. arctica* Robinson & Fernald in Gray, Man. ed.

7, 733 (1908); Britton & Brown, Ill. Fl. ed. 2, 217 (1913); in part, not Lange.— Gracilis 6–30 cm. alta simplex vel sub medio plus minusve ramosa, ramis plerumque arcte adscendentibus puberulis; foliis plerumque 9–16-jugis ovatis vel orbicularibus 8–18 mm. longis grosse crenato-dentatis sparse pubescentibus subremotis, internodiis plerumque 3 rare 7 cm. longis; spicis interruptis deinde perlongis; eis primariis maturis 0.5–2.7 dm. longis; bracteis 5–20-jugis remotis grandis patentibus vix reductis, dentibus grossis acutis; corollis 4–5.5(–6) mm. longis oculis luteis; labio superiore purpureo-tincto paullo 2-lobato, lobis paullo truncatis undulatis vel denticulatis semi-reflexis vix revolutis; labio inferiore albido purpureo-lineolato patente vix flabelliforme, lobis oblongis emarginatis; capsulis 4–5 mm. longis calycis dentibus peracutis vix aristatis aequantibus paullo pubescentibus retusisque.

Slender, 6–30 cm. high, simple or more or less branched below the middle; branches slender, usually strongly ascending, puberulent: leaves 9–16 pairs, or in dwarfed plants fewer, ovate or orbicular, 8–18 mm. long, coarsely crenate-dentate, sparingly pubescent, somewhat remote; the internodes mostly 3 (rarely to 7) cm. long, in dwarf plants shorter: spikes interrupted, becoming very long, the primary mature ones 0.5–2.7 dm. long: bracts 5–20 pairs, remote, large, spreading, scarcely reduced, with coarse acute teeth: corolla 4–5.5(–6) mm. long, with a yellow eye; upper lip tinged with purple, slightly 2-lobed, the lobes a little truncate, undulate or denticulate, semi-reflexed but scarcely revolute; lower lip white with purple lines, spreading but scarcely fan-shaped, the oblong lobes notched: capsule 4–5 mm. long, equaling the very acute but not aristate calyx-teeth, slightly pubescent, barely retuse.— Damp open places, Labrador and Newfoundland to northern Maine, Alberta, Mackenzie and Alaska. LABRADOR: 20 miles north of Nachvak, August 28, 1908, *H. S. Forbes;* crevices of rock, Nachvak, July 29, 1884, *R. Bell;* Flint Island, near Port Manvers, August 22, 1908, *Owen Bryant;* Hopedale, August 11, 1891, *Bowdoin College Expedition,* no. 242; rocky places, Battle Harbor, August, 1911, *C. S. Williamson;* springy banks and damp hillsides, Forteau, July 30, 1910, *Fernald, Wiegand & Kittredge,* no. 3994; on the gneiss plain in damp soil, Blanc Sablon, July 31 and September 3, 1910, *Fernald & Wiegand,* nos. 3987, 4012. NEWFOUNDLAND: grassy slopes near shore, Black Island, Notre Dame Bay, July 20, 1911, *Fernald, Wiegand & Bartram,* no. 6165; ledges, talus and gravel, north bank of Exploits River below the falls, Bishop Falls, July 28, 1911, and Grand Falls, July 22 and August 12, 1911, *Fernald, Wiegand & Darlington,* nos. 6166, 6167, 6168, and 6169 (TYPE in Gray Herb.); granitic ledges and gravel along a brook, Quarry, August 23, 1911, *Fernald & Wiegand,* no. 6170; gravel along Kitty's Brook, August 25, 1911, *Fernald & Wiegand,* no. 6171; grassy strand of Ingornachoix Bay, August 2, 1910, *Fernald, Wiegand & Kittredge,* no. 3986; calcareous rocks and talus, entrance to Port Saunders

Harbor, August 1, 1910, *Fernald, Wiegand & Kittredge,* no. 3993; grassy fields overlying conglomerate limestones and calcareous sandstones, Cow Head, July 22, 1910, *Fernald & Wiegand,* no. 3983; barrens at base of the serpentine tablelands, Bonne Bay, August 27, 1910, *Fernald & Wiegand,* no. 4005; Southeast Arm, Bonne Bay, August 31, 1910, *Fernald & Wiegand,* no. 4011; heath on diorite tableland, altitude about 380 m., "Lookout Mountain," Bonne Bay, August 26, 1910, *Fernald & Wiegand,* no. 4010; low thicket on coast, Bay of Islands, August 6, 1908, *Eames & Godfrey,* no. 8071; park-like openings in damp woods and in open peat bogs back of Curling (Birchy Cove), July 5–August 10, 1910, *Fernald, Wiegand & Kittredge,* nos. 3979, 3980, 3982; moist grassy places on highest peak at about 650 m. altitude, Blomidon, July 31, 1908, *Eames & Godfrey,* no. 8072; diorite tableland, altitude about 550 m., Blomidon, August 22, 1910, *Fernald & Wiegand,* no. 4004; springy banks along Harry's River, August 18, 1910, *Fernald & Wiegand,* no. 4008; dry limestone barrens and in wet runs and boggy spots, upper slopes and tablelands, altitude 200–300 m., also in mossy spruce woods on slope, Table Mountain, Port à Port, August 16, 1910, *Fernald & Wiegand,* nos. 3997, 3999, 4000. Quebec: Esquimaux River, lat. 51° 59′, July 27, 1882, *J. A. Allen,* no. 69; grassy shores, Vieux-Fort, Canton Pontchartrain, St. Paul, Canton Chevalier, and Bradore, Canton Brest, Saguenay County, July 25, 26 and 29, 1915, *St. John.* New Brunswick: mountain slopes, Gloucester County, 1867, *J. Fowler,* Herb. Geol. Surv. Can., no. 17,445. Maine: St. John River, *G. L. Goodale.* Alberta: Rocky Mountains, *Drummond;* in boggy spots, altitude 2530 m., mountains north of Devil's Lake, August 18, 1891, *J. Macoun,* Herb. Geol. Surv. Can., no. 17,446. Mackenzie: grassy places, Lewes River, lat. 62°, August 20, 1887, *Dawson,* Herb. Geol. Surv. Can., no. 17,449. Alaska: mouth of Chilkat River, lat. 59°, 1883, *F. Meehan;* Dalton Landing, vicinity of Yakutat Bay, August 15, 1892, *Frederick Funston,* no. 125; Kadiak Island (Gray Herb.); Shumagin Islands, 1871–72, *M. W. Harrington;* grassy slopes, St. Paul's Island, August 3, 1891, *J. M. Macoun.*

The flowers of *E. disjuncta* are smaller than those of any other species in the group which has the lobes of the upper lip strongly reflexed. The pubescent leaves and bracts, the small flowers, open inflorescence, and large spreading bracts with merely acute teeth are the chief characteristics.

6. E. arctica Lange in Rostrup, Bot. Tidskr. iv. 47 (1870); Robinson & Fernald in Gray, Man. ed. 7, 733 (1908), in large part; Britton & Brown, Ill. Fl. ed. 2, 217, fig. 3840 (1913), in large part. *E. latifolia* Pursh Fl. Am. Sept. ii. 430 (1814), as to Labrador plant; Wettstein, Monog. d. Gatt. Euphrasia, 136 (1896); Britton & Brown, Ill. Fl. iii. 182, fig. 3325 (1898); Robinson, Rhodora, iii. 274 (1901);

in part not *E. latifolia* L. (1753). *E. officinalis, β. latifolia* Lange, Overs. ov. Grönl. Flora, 79 (1880), as to plant. *E. officinalis, β tatarica* Benth. in DC. Prodr. x. 552 (1846), in part, not *E. tatarica* Fischer (1825). *E. officinalis, γ alpestris* b. *arctica* Herder, Bull. Soc. imp. nat. Mosc. 1884, pars. 3, 46. *E. officinalis*, var. *hyperborea* Favr. acc. to Wettstein, l. c. (1896). *E. hirtella* Robinson, Rhodora, iii. 275 (1901), in large part, not Jordan.— Plant 5–25 cm. high, slender: stem pubescent: branches few, rarely many, from the middle of the stem or below, usually strongly ascending; internodes mostly 8–15 mm. long: leaves 5–15 mm. long, mostly rather small, from copiously to sparingly pubescent: inflorescence dense, uninterrupted above (except in "drawn" plants), the mature primary spikes 3–15 cm. long: bracts 7–20 pairs, usually rather small, ascending and often imbricated, the lowest in maturity 0.5–2 cm. apart; teeth acute: corolla white with pale lavender lines and often darker upper lip, 5–7 mm. long, exceeding the bracts; lobes of the lower lip nearly parallel.— In dry or rarely damp, often calcareous, soils, mountains of northern Europe, Iceland and Greenland, south to Newfoundland, eastern Quebec, Michigan and Minnesota. Labrador: Kangalaksiorvik Bay, September 1–10, 1908, *Owen Bryant;* Nachvak, September 4, 1900, *E. B. Delabarre;* Rama, July–August, 1899, *A. Stecker*, no. 343; Hopedale, August 4–6, 1897, *J. D. Sornborger*, no. 82; Indian Harbor, Hamilton Inlet, August 2, 1891, *Bowdoin College Expedition*, no. 193. Newfoundland: dry limestone barrens, upper slopes and tablelands, altitude 200–300 m., Table Mountain, Port à Port Bay, August 16, 1910, *Fernald, Wiegand & Kittredge*, no. 4001; Quebec: grassy ledge, Isle Netagamiou, Archipelago of Petit Mécatina, Saguenay County, August 22, 1915, *St. John;* damp gravelly places, Jupiter River, Anticosti, August 27, 1883, *J. Macoun*, Herb. Geol. Surv. Can., no. 17,441; cliff-shores of Gaspé Bay, Douglastown, August 22, 1904, *Collins, Fernald & Pease;* Bonaventure conglomerate (calcareous) sea-cliffs, Bonaventure Island, August 7 and 8, 1907, *Fernald & Collins*, no. 1166; summit of Mt. Ste. Anne, Percé, August 18, 1904, *Collins, Fernald & Pease;* everywhere in dry open soil and sterile turfy places, mouth of Grand River, Gaspé County, August 11–15, 1904, *Collins, Fernald & Pease;* damp mossy and grassy slope, Pointe Nouvelle, Hope Township, July 30, 1902, *Williams & Fernald;* gravelly beach at Paspébiac Lighthouse, July 27 and 29, 1912, *Williams & Fernald;* wet red-sandstone bluffs and steep slopes between Baldé and the Baie des Chaleurs, Bonaventure River, August 5, 6 and 8, 1904, *Collins, Fernald & Pease.* Ungava: Fort George, July 17, 1899, *A. P. Low*, Herb. Geol. Surv. Can., no. 62,569. Ontario: mouth of Albany River, July 25, 1904, *W. Spreadborough*, Herb. Geol. Surv. Can., no. 62,568; north shore of Lake Superior, 1848, *Agassiz;* Lake Superior, 1879, *T. S. Roberts.* Michigan: Isle Royale, 1849, *Whitney*, July 30, 1909, *W. S. Cooper*, no. 76. Minnesota: Good Harbor, August 14,

1868, *H. Gillman*. Keewatin: Churchill, lat. 58° 50′, July 29 and August 3, 1910, *J. M. Macoun*, Herb. Geol. Surv. Can., nos. 79,380, 79,381.

Intermediate between *E. disjuncta* and *E. stricta*, var. *tatarica*. Extremes are difficult to distinguish from those plants. From the former *E. arctica* differs in the shorter internodes, denser inflorescence with more ascending bracts, more acute bracteal teeth, and slightly larger corolla. From the latter it may be distinguished by the less subulate bracteal teeth and smaller corolla with paler lines and with less spreading lobes of the lower lip.

Wettstein took up for this boreal species the name *E. latifolia* Pursh, not L. (or, as Pursh said, Willdenow), because the Linnean (and Willdenowian) *E. latifolia* does not belong to the genus *Euphrasia* as now interpreted and because the Labrador plant seen by Pursh *was* a true *Euphrasia* (the plant here treated as *E. arctica*). It is clear, however, from Pursh's treatment that he had no intention of publishing a new species but merely copied literally from Willdenow the description of the Linnean *E. latifolia* of the Mediterranean region, a plant belonging in the genus *Parentucellia*.

7. E. **hudsoniana**, n. sp. Planta 5–22 cm. alta; caulibus pubescentibus simplicibus vel inferne sparse ramosis, ramis longis valde adscendentibus, internodiis inferioribus 1.5–4 cm. longis; foliis oblongis 15 mm. longis sparse pubescentibus, dentibus paucis acutis; spicis longis, eis primariis in maturitate 0.5–1.5 dm. longis, internodiis inferioribus 1–3 cm. longis; bracteis 5–15-jugis grandis oblongis 7–15 mm. longis adscendentibus grosse acutissimeque serratis, dentibus aristatis; corolla 5.5–6 mm. longis albidis violaceo-lineolatis; labio superiore purpureo-tincto bilobato, lobis semireflexis; labii inferiori lobis vix divergentibus.

Plant 5–22 cm. high; stem pubescent, simple or sparingly branched below; branches long, strongly ascending; lower internodes 1.5–4 cm. long: leaves oblong, 15 mm. long in the larger plants, sparingly pubescent, with a few very coarse acute teeth: spikes rather long; the primary ones in maturity 0.5–1.5 dm. long, with the lowest internodes 1–3 cm. apart: bracts 5–15 pairs, large, oblong, 7–15 mm. long, ascending, coarsely and very sharply aristate-toothed: corolla 5.5–6 mm. long, whitish with pale violet lines; upper lip suffused with purple, bilobed, the lobes semi-reflexed; lower lip with the lobes scarcely divergent.— Grassy places about Hudson Bay; little known. Ungava: Koaksoak River, August, 1896, *Spreadborough* (type in Gray Herb.); duplicate types in Herb. Geol. Surv. Can., nos. 14,472 & 62,237. British North West America: specimen coll. *Franklin Expedition; King* in Back's Voyage. Macoun's material (Herb.

Geol. Surv. Can., no. 17,448) from Bow River Pass, Alberta, is overripe but has similar bracts.

Similar to *E. canadensis* but with pubescent leaves and bracts, the latter oblong and usually more ascending and larger than in *E. canadensis*. In outline of foliage suggesting the European *E. salisburgensis* Funck, which, however, has the leaves and bracts pectinate, the spike denser, and the lower internodes rarely 1 cm. long.

8. E. CANADENSIS Townsend, Journ. Bot. xxxvi. 1, t. 381 (1898); Robinson & Fernald in Gray, Man. ed. 7, 733 (1908). *E. officinalis* Michx. Fl. Bor.-Am. ii. 16 (1803); Pursh, Fl. ii. 430 (1814); Pringle, Bull. Torr. Bot. Cl. vi. 366 (1879); *J. I. & A. B. Northrop*, Bull. Torr. Bot. Cl. xvii. 27 (1890), in part; not L. *E. americana*, var. *canadensis* Robinson, RHODORA, iii. 276 (1901).— Plant rather low, 0.5–2.5 dm. high, simple or more or less bushy-branched from below the middle; branches mostly arcuate-ascending; internodes short: leaves of medium size, the primary 0.5–1 cm. long, glabrous, the teeth acute or obtuse: spikes very elongate, dense above, the primary one nearly the full height of the plant: bracts spreading, rarely at all imbricated above, with bristle-tipped teeth, the lowest in maturity 0.3–1.5-(rarely –2.5) cm. apart: corolla 5–6.5 mm. long, white with lavender or bluish veins and with a violet tinge on the upper lip; upper lip 2-lobed, the lobes half-reflexed, truncate and shallowly toothed; lower lip only slightly fan-shaped.— Open barren fields and turfy roadsides, mostly about settlements, Quebec, the Maritime Provinces and northern New England. QUEBEC: open ground, very common, Rivière Blanche, August 8, 1904, *F. F. Forbes;* Little Métis, August 1, 1906 and August 22, 1907, *J. Fowler;* common in open sterile soil, New Richmond, July 28–August 1, 1904, *Collins, Fernald & Pease;* open damp spots, Carleton, July 23, 24 and 27, 1904, *Collins, Fernald & Pease;* turfy spots and open pastures, Bic, July 16 and 18, 1904 and July 27, 1907, *Fernald & Collins;* crevices of rock, damp hollows, etc., Rivière du Loup, August 2, 1902, *Williams & Fernald;* fields, Temiscouata, July 26, 1878, "probably introduced from Europe," *C. G. Pringle;* Tadousac, August 5, 1902, *E. F. Williams*, October, 1909 *Emily F. Fletcher;* St. Alphonse, Ha Ha Bay, August 5, 1902, *E. F. Williams;* near Ouatchouan Falls, Lake St. John, August 29, 1904, *W. F. Wight*, no. 224; old fields, Cap à l'Aigle, July, August, 1905, *J. Macoun*, Herb. Geol. Surv. Can., nos. 67,825, 67,826; Quebec, July 21, 1792, *Michaux* (herb. Michx.), *Houghton, Jos. Blake*, et al.; fields, roadsides, and in serpentine and soapstone gravels, East Broughton, August 23, 1915, *M. L. Fernald & H. B. Jackson;* open pasture and wet ground, Georgeville, July 10 and 23, 1902, *J. R. Churchill.* PRINCE EDWARD ISLAND: Malpeque, July 20, 1904, *J. Fowler.* NOVA SCOTIA: L'Ardoire, Cape Breton, August 1, 1892, *Walter Faxon;* Barrington Passage, July 9, 1910, *J. Macoun*, Herb. Geol. Surv. Can., no. 80,657. NEW BRUNSWICK: Shediac, August 5,

1904, *J. Fowler;* Campbellton, July 1, 1877, *R. Chalmers,* Herb. Geol. Surv. Can., no. 17,447. Maine: barren fields about Boundary Lake, August 12, 1902, *Eggleston & Fernald;* dry open places, Frenchville, August 12, 1901, *Williams, Robinson & Fernald,* Pl. Exsicc. Gray., no. 62; dry field, Hamlin, September 18, 1896, *Fernald;* Monhegan Island, 1901, *C. F. Jenney,* 1902, *F. Grace Smith,* no. 77. New Hampshire: at north door of Glen House, July 28, 1865, *Wm. Boott;* roadside, base of Mt. Washington, August 10, 1878, *J. A. Allen;* damp mossy places on side of road about $1\frac{1}{2}$ miles from Glen House toward Jackson, August 9, 1902, *F. F. Forbes;* roadside $\frac{1}{2}$ mile south of Glen House, September 5, 1908, *A. S. Pease,* no. 11,550; lawn of Glen House, August 2, 1907, *A. S. Pease,* no. 10761; road between Glen House and Tuckerman's Ravine, August 19, 1903, *A. H. Moore,* no. 1424.

E. canadensis is closely related to *E. arctica* and *E. stricta.* From the former it differs in the glabrous foliage and more aristate bracteal teeth; from the latter in the smaller corolla with paler veins and less spreading lateral lobes of the lower lip, and the usually lower stature, with more basal branching and more spreading bracts. It is found in fields, by roadsides and in other somewhat artificial habitats in the neighborhood of settlements and has every appearance of an introduced plant. Pringle, when he collected it in Temiscouata County, Quebec, in 1878, wrote of it, "doubtless introduced from Europe" (Bull. Torr. Bot. Cl. vi. 366). Nevertheless, as pointed out by Townsend, the plant does not exactly match any European species; and although strongly inclined to believe the species a recent introduction in Quebec and northern New England, we have sought in vain for an exact match for it in the Old World species. Its nearest affinity is apparently with *E. nemorosa* Pers., but it usually begins flowering from nearer the base and its branches are more confined to the base than in the European *E. nemorosa. E. canadensis* is usually lower than *E. nemorosa* and has rather larger leaves and bracts. In this connection it is significant that the plant was collected by Michaux at Quebec in 1792, the material in his herbarium being quite typical *E. canadensis.* Townsend, in publishing the species, said: "As to the history of *E. canadensis,* it is difficult to form an opinion without further knowledge of its present geographical distribution; whether it be an importation from Europe at a remote though historic period, modified by climatic or other influences, or whether it be the descendant of an ancient but indigenous form. As regards *E. americana* Wetts., Prof. Wettstein inclines to the idea of importation, as stated in his Monograph, p. 128."

The three species, *E. canadensis*, *E. americana*, and *E. stricta*, form, with the local and very distinct *E. hudsoniana* of Ungava, a group of species quite unlike our other large-flowered Euphrasias in the bristle-tipped teeth of the bracts, in this character being like several of the common European plants. *E. stricta* and its var. *tatarica* are European and possibly introduced in America, though the variety seems like an indigenous plant. It is possible, then, that *E. canadensis* and *E. americana* are derivatives of *E. nemorosa* and of *E. stricta* (doubtfully indigenous in America) or of some closely related European species introduced into eastern Canada and eastern Maine by the earliest European colonists, in the 16th or 17th centuries; and, being annuals, the plants have, during hundreds of generations, departed sufficiently from their ancestors now to stand as true American species. (See also notes under *E. stricta* and *E. americana*).

The Monhegan Island material referred here is not in satisfactory condition and further collections may show it to belong, rather, to *E. stricta*.

9. E. STRICTA Host, Fl. Austr. ii. 185 (1831); Wettstein, Monogr. d. Gatt. Euphrasia, 93 (1896), which see for detailed synonymy. *E. borealis* Fernald, RHODORA, ix. 163 (1907) and x. 201 (1908), not (Towns.) Wettst.— Plant 0.5–3 dm. high, usually rather strict, with a few short ascending branches mostly from near the middle of the stem, occasionally bushy-branched; internodes rather short, 1–2 cm. long: leaves small, the primary ones 3–10 mm. long, glabrous, few-toothed; the teeth coarse, acute: spikes long, dense and rather slender, the primary becoming 0.4–2.5 dm. long: bracts 10–30 pairs, glabrous, small, ascending, the upper imbricated, the lowest rarely more than 1 cm. apart; teeth very sharp, bristle-tipped: corolla large, 6–8 mm. long, exceeding the bracts, pale with deep-violet lines; upper lip more purplish, bilobed, each lobe semi-reflexed, truncate and denticulate; lower lip fan-shaped, the lateral lobes wide-spreading.— Dry fields and sterile grasslands, Newfoundland to Maine and northern New York; also Europe. NEWFOUNDLAND: fields, St. John's, July 31, 1894, *Robinson & Schrenk*, no. 102; damp soil, Torbay, August, 1901, *Howe & Lang*, no. 1450. QUEBEC: damp hollow, near mouth of Grand River, Gaspé County, August 11–15, 1904, *Collins, Fernald & Pease;* dry calcareous soil, Les Murailles, Percé, August 17, 1904, *Collins, Fernald & Pease;* sandy grassland, New Carlisle, July 28, 1902, *Williams & Fernald;* gravelly soil, Giroux, July 26, 1902, *Williams & Fernald.* PRINCE EDWARD ISLAND: grassy roadsides near Cozen's Pond, August 29, 1912, *Fernald, Long & St. John*, no. 8027. NEW BRUNSWICK: Campbellton, August 29, 1905, *J. Fowler;* pasture, Miscou Harbor, August 26, 1913, *S. F. Blake*, no. 5543a.

Nova Scotia: Commeauville, August, 1900, *L. L. Dame;* La Have River, August 6, 1910, *J. Macoun*, Herb. Geol. Surv. Can., no. 80,660. Maine: Machiasport, August, 1898, *M. A. Barber;* South West Harbor, August 30, 1890, *E. L. Rand*, September 19, 1892, *Fernald;* fields, Great Cranberry Isle, August 5, 1890, *J. H. Redfield*, 1897–98, *E. L. Rand;* Baker's Island, July 22, 1901, *Rand;* South Duck Island, August 9, 1893, *Redfield;* fields and roadsides, Sunshine, Deer Isle, August 26, 1912, *A. F. Hill*, no. 294; Swan Island, August, 1910, *Kate Furbish;* clearings and fields, Dark Harbor, Islesboro, August 14, 1913, *Woodward, Bissell & Fernald;* roadside, Clinton, August 13, 1911, *R. C. Bean;* roadsides and dry grassy door-yard, Bayville, August 30, 1911, *F. O. Grover;* Portland Road, Brunswick, August 26, 1913, *Kate Furbish.* New York: pasture, Waddington, August 29, 1914, *Orra Parker Phelps*, no. 95.

Similar, in the long spikes extending nearly to the base of the plant, to *E. canadensis*, but the branches fewer and less basal and the corolla slightly larger, with darker lines and with wide-spreading lobes of the lower lip; and the bracts less spreading and with slightly sharper teeth. The collections of *E. stricta* are all of recent date and the habitats so generally are fields, roadsides, lawns, and other situations associated with civilization that it seems that *E. stricta* has been recently introduced from Europe. In Maine it is spreading rapidly and in recent years has extended into well known areas where it is reasonably certain that it formerly did not occur.

9a. E. stricta, var. **tatarica** (Fischer), n. comb. *E. tatarica* Fischer in Spreng. Syst. Veg. ii. 777 (1825); Wettstein, Monogr. d. Gatt. Euphrasia, 88 (1896), which see for detailed synonymy. *E. officinalis*, β. *tatarica* Benth. in DC. Prodr. x. 552 (1846), in part.— Resembling *E. stricta* in habit, etc., but with the leaves and bracts pubescent and the bracteal teeth not so sharp.— Apparently confined to gravelly slopes or cliffs in the maritime district of Gaspé, Saguenay Counties, Quebec; Eurasia. Quebec: grassy shore, Natashquan, Saguenay County, September 6, 1915, *St. John;* grassy shore, Betchouane, Seigniory of Mingan, Saguenay County, September 9, 1915, *St. John;* dry calcareous soil, detritus or thin turf, summits and slopes, abundant at Percé, August, 1904, *Collins, Fernald & Pease;* Mont Rouge, Percé, July 23, 1905, *Williams, Collins & Fernald;* cliff-shores of Gaspé Bay, Douglastown, August 22, 1904, *Collins, Fernald & Pease;* dry open soil, mouth of Grand River, August 11–15, 1904, *Collins, Fernald & Pease.*

Possibly introduced, but seeming like an indigenous plant.

10. E. americana Wettstein, Monogr. d. Gatt. Euphrasia, 127 (1896) and Bot. Gaz. xxii. 401 (1896); Britton & Brown, Ill. Fl. iii. 182, fig. 3326 (1898); Robinson, Rhodora, iii. 275 (1901); Kennedy,

Rhodora, iv. 26 (1902); Moulton, ibid. 189 (1902); Robinson & Fernald in Gray, Man. ed. 7, 733 (1908); Cushman, Rhodora, xi. 13 (1909); Fernald & Wiegand, Rhodora, xii. 103, 143 (1910). *E. officinalis* Gray, Syn. Fl. ii. pt. 1, 305 (1878), in part; Redfield, Bull. Torr. Bot. Cl. xii. 103 (1885) and xiii. 232 (1886); Lawson, Bull. Torr. Bot. Cl. xiv. 10 (1887); Vroom, ibid. 12 (1887); Chickering, Bot. Gaz. xiii. 322 (1888), in part; not L.— Plant 1–4 dm. high, simple or more or less branched; branches long, spreading or arcuate-ascending: leaves ovate-oblong, glabrous, the primary 0.5–2 cm. long, coarsely toothed; teeth acute or obtuse: spikes rather short, except in full fruit, occupying the ends of the stems and branches, in maturity becoming 3–15 cm. long: bracts 5–18 pairs, glabrous, conspicuous, broadly ovate, more or less spreading, coarsely aristate-toothed, the lowest in maturity 0.5–2 cm. apart: flowers medium to large: corolla pale, 7–10 mm. long; upper lip tinged with purple, shallowly bilobed, the lobes partly reflexed, each 2–3-toothed; lower lip large, white with dark-purple lines, fan-shaped, the lateral lobes wide-spreading.— The commonest *Euphrasia* throughout southeastern Maine, the Maritime Provinces, and Newfoundland, rarely found far away from habitations. Newfoundland: fields and roadsides, Killigrew's, August 3, 1911, *Fernald & Wiegand,* no. 6176; dry roadsides and pastures, Carbonear, August 6 and 7, 1911, *Fernald & Wiegand,* no. 6177; roadsides and dry clearings, Whitbourne, August 8, 1911, *Fernald & Wiegand,* no. 6178; Clarenville, July 18, 1902, *L. L. Dame;* Fogo Island, August 7, 1903, *J. D. Sornborger;* grassy shore of Dildo Run, New World Island, July 17, 1911, *Fernald, Wiegand & Bartram,* no. 6174; Glenwood, July 12 and 13, 1911, *Fernald, Wiegand & Darlington,* no. 6172; ledges, talus and gravel, north bank of Exploits River, below the falls, Bishop Falls, July 28, 1911, *Fernald, Wiegand & Darlington,* no. 6175; gravelly railroad bank near Rushy Pond, July 15, 1911, *Fernald, Wiegand & Bartram,* no. 6173; alluvium of brook, Quarry, August 23, 1911, *Fernald & Wiegand,* no. 6179; Grand Lake, July 25–August 15, 1906, *Owen Bryant;* grassy fields, Cow Head, July 23, 1910, *Fernald & Wiegand,* no. 3984; railway gravel near Bay of Islands station, July 18, 1910, *Fernald, Wiegand & Kittredge,* no. 3981; damp pastures, Birchy Cove (Curling), August 10, 1910, *Fernald, Wiegand & Kittredge,* no. 3989; open moist and grassy to dry and sterile places, Bay of Islands, August 10, 1908, *Eames & Godfrey,* no. 8063; fields, Doyle's, Great Codroy River, July, 1912, *J. R. Lunt;* field near coast, Channel, July 27–August 1, 1901, *Howe & Lang,* no. 789. Quebec: sterile soil, western end of Bonaventure Island, August 7 and 8, 1907, *Fernald & Collins,* no. 1165; fields and tops of sea-cliffs, Paspébiac, July 26, 1902, *Williams & Fernald;* sandy grassland, New Carlisle, July 28, 1902, *Williams & Fernald.* Magdalen Islands: dry sandy summit of Great Bird Rock, August 7, 1914, *St. John,* no. 1645; dry sandy headlands, Brion Island, August, 1914, *St. John,* nos. 1643, 1644;

open fields and recent clearings, Grindstone, Grindstone Island, July 22 and August 13, 1912, *Fernald, Long & St. John*, no. 8024, 8026. Prince Edward Island: dry sandy roadsides and fields, Tignish, August 6, 1912, *Fernald, Long & St. John*, no. 8025; Royalty Junction and Summerside, July, 1901, *J. R. Churchill;* among grass, East Point, August 15, 1888, *J. Macoun*, Herb. Geol. Surv. Can., no. 17,439; grassy places, Union Road, August, 1888, *J. Macoun*, Herb. Geol. Surv. Can., no. 17,444. Nova Scotia: McDonald's, Dingwall, Aspy Bay, July 14, 1909, *J. R. Churchill;* Sydney, July 17, 1902, *G. H. Morris;* common in grassland, Sydney, August, 1902, *Fernald;* Big Intervale, Cape Breton Island, July, 1898, *J. Macoun*, Herb. Geol. Surv. Can., no. 19,896; Barrington Passage, July, 1910, *J. Macoun*, Herb. Geol. Surv. Can., nos. 80,661, 80,664; Canso, August 2, 1901, *J. Fowler;* dry field, Sunny Brae, July 28, 1913, *St. John*, no. 1447; thin soil, Black Hole, near Baxter's Harbor, Scott's Bay, August 24, 1902, *Fernald;* sandy soil, Vault Road, North Mountain, near Sheffield's Mill, August 24, 1902, *Fernald;* dry soil, roadside, Windsor Junction, July 11, 1901, *Howe & Lang*, no. 433; Bridgewater, July, 1910, *J. Macoun*, Herb. Geol. Surv. Can., nos. 80,658, 80,659; rocks, Bell's Island, August 10, 1910, *J. Macoun*, Herb. Geol. Surv. Can. no. 80,662; Cape Sable Island, June 30, 1910, *J. Macoun* Herb. Geol. Surv. Can., no. 80,656. New Brunswick: thin grassland, Bathurst, July 23, 1902, *Williams & Fernald;* grassy roadside, Bathurst, August 13, 1913, *S. F. Blake*, no. 5368; sphagnum bog, Grande Anse, August 22, 1913, *Blake*, no. 5526; pasture, Miscou Harbor, August 26, 1913, *Blake*, no. 5543; St. John, *Wm. Boott* (August 8, 1873) *et al.;* St. Andrews, August, 1900, *J. Fowler;* Campobello Island, 1902, *W. G. Farlow;* Grand Manan Island, 1902, *W. G. Farlow.* Maine: open grassland, New Limerick, August 13, 1909, *Fernald*, no. 2114; slaty bank 1 mile above Oldtown, August 2, 1908, *Fernald;* gravelly open soil, Princeton, July 22, 1909, *Fernald*, no. 2117; Passamaquoddy Bay, August, 1892, *F. L. Harvey;* Moose Island, Passamaquoddy Bay, August, 1909, *Fernald*, nos. 2116, 2118, 2119; dry soil, Pleasant Point, Perry, August, 1909, *Fernald;* Cross Island, August, 1902, *Kate Furbish;* Cutler, August, 1902, *Kate Furbish;* roadside, Marshfield, July 8, 1902, *Fernald;* mossy roadside in woods between East Machias and Cutler, July 16, 1901, *G. G. Kennedy;* roadside, East Machias, July 23, 1910, *C. H. Knowlton;* Machias, August, 1888, *J. W. Chickering;* Black Island, July 20, 1894, *J. H. Redfield;* grassland, Great Cranberry Island, *Faxon & Rand* (1894) *et al.;* Sea Wall, Mt. Desert Island, 1891 and 1892, *Rand;* moist spots on roadsides, Brooklin, July 22, 1912, *A. F. Hill*, no. 234.

Wettstein's *Euphrasia americana* was a complex, consisting of the *E. officinalis* of Pursh's *Flora*, of specimens from St. John, New Brunswick (*Matthew*) and Quebec (*Canby*), and some material labeled "Flor. Am. bor." (Hooker). The *E. officinalis* of Pursh's *Flora* was

Michaux's plant from Quebec, which is *E. canadensis;* the Canby material from Quebec was presumably also *E. canadensis,* the common plant in the neighborhood of Quebec; but the St. John specimen, the first mentioned, therefore the type, and also the plant illustrated by Wettstein, is characteristic of the species here taken up as *E. americana.*

E. americana, like *E. canadensis* and *E. stricta,* has the appearance of an introduced plant, being extremely weed-like and inhabiting fields, pastures, roadsides and other artificial habitats in the neighborhood of civilization. The earliest collection seen by us was made by William Boott at St. John, New Brunswick, in 1873. Since then the species has been found in seemingly increasing abundance throughout the coastal districts of the Maritime Provinces, Newfoundland and Maine, closely following the progress of civilization into the interior of Newfoundland. In 1885, in making what seems to be the first clear record of the plant in Maine (though *E. stricta* may have been included), Redfield listed it among "recent introductions" (Bull. Torr. Bot. Cl. xii. 103) and in 1886 again wrote of it as "an introduced plant" (*ibid.* xiii. 232). But in 1887, Lawson, noting the wide distribution in Nova Scotia of the plant, said: "I know of no reason for regarding our common Canadian form otherwise than as indigenous" (Bull. Torr. Bot. Cl. xiv. 10) and at the same time (p. 12) Vroom, noting the plant about the ports of New Brunswick, said: "Though regarded here as a native, its being most frequent near the older settlements would seem to favor the opinion that it has been introduced." In publishing the species, Wettstein suggested the possibility of its being a modern derivative from the European *E. nemorosa;* but *E. americana* is at once distinguished by its larger flowers. Its affinity, it seems to us, is more with *E. stricta,* but ordinarily *E. americana* is readily separated from that species by the shorter spikes and more spreading bracts. From *E. canadensis* it is distinguished by its larger corollas with usually darker lines and its proportionally shorter spikes.

A New Form of Polygala polygama.— Polygala polygama Walt. forma **obovata,** n. forma. Folia caulina cuneate obovata supra medium latissima apice obtusa vel rotundata interdum cuspidulata basi cuneate angustata sessilia glaberrima margine vix revoluta

9–19 mm. longa 3–8 mm. lata; ea stolonum similia majora 1.5–2.3 cm. longa 6–9.5 mm. lata. Stem leaves wedge-obovate, broadest above the middle, obtuse or rounded at apex, sometimes cuspidulate, cuneately narrowed to the sessile base, glabrous, barely revolute on margin, 9–19 mm. long, 3–8 mm. broad; those of the stolons similar but larger, 1.5–2.3 cm. long, 6–9.5 mm. broad.

Florida: swampy places between Tallahassee and St. Marks, April–May, 1843, *Rugel* 106 (Brit. Mus.); Louisiana: New Orleans, 1832, *Drummond* 38 (type coll.: Brit. Mus.).

Rather strikingly different from the type in leaf-form, but in flower-characters identical, and scarcely worthy of more than formal rank. Rugel's number 106 represents in part a state of this forma answering to Chodat's var. *abortiva* of the typical form, which has been shown by Dr. Robinson (see Rhodora ii. 242 (1900)) to be merely an ordinary antumnal phase like that found in the genus *Viola*.— S. F. Blake, London, England.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT,— XXI.

NYCTAGINACEAE.

OXYBAPHUS.

O. floribundus Chois. Ayer (*G. M. Allen*, Sept. 20, 1912; specimen in herb. Boston Soc. Nat. Hist.). Fugitive from the west.

O. nyctagineus (Michx.) Sweet. Roadsides and fields; Woburn, Cambridge, Dedham, Brockton, Duxbury. Very abundant and conspicuous at Duxbury. See Rhodora xiv. 20, 90, 1912. Introduced from the west.

ILLECEBRACEAE.

ANYCHIA.

A. canadensis (L.) BSP. Dry woods, frequent. Not reported from southeastern towns.

A. polygonoides Raf. Dry open places; Burlington, Danvers, W. Boston (dump, 1882), Hyde Park, W. Quincy (Blue Hills near Dome).

ILLECEBRUM.

I. VERTICILLATUM L. Well established in abandoned nursery, Reading (*C. C. Kingman,* specimen in herb. Gray). Native of Europe and N. Africa. See RHODORA xiv. 207, 1912.

PARONYCHIA.

P. argyrocoma (Michx.) Nutt., var. **albimontana** Fernald. Island in Merrimac River above Newburyport (*Dr. Karl Castelhun,* June, 1884). See Fernald, RHODORA viii. 101–104, 1906. Dr. Castelhun wrote to the Peabody Academy of Science under date of June 27, 1884; "The credit of finding *Paronychia* belongs to Mr. Ordway, who lives opposite the island. It grows on the rocks close to the shore at the upper end of the island. This location may indicate that the seeds drifted down river a few years ago, as people tell me it was not seen until two or three years ago. However, it seems to me it may have been overlooked."

SCLERANTHUS.

S. ANNUUS L. Gravel and sand, very common throughout.

AIZOACEAE.

MOLLUGO.

M. VERTICILLATA L. Dry sand and gravel, very common throughout.

C. H. KNOWLTON } *Committee on*
WALTER DEANE } *Local Flora.*

THE TWENTY-FIRST ANNUAL MEETING OF THE JOSSELYN BOTANICAL SOCIETY OF MAINE was held at Waterville, August 10–14, 1915.

The excessive rain, continuing to the time of the meeting, was a discouraging feature, but with four days at Waterville, which were cool and pleasant, and an attendance of twenty members, the field work was satisfactory, except that the river shores, the bogs and low

grounds were inundated and failed to yield the characteristic flora. For this reason very few species of *Carex* or other sedges were seen.

Many of the interesting localities visited by members of the Society in 1898 were again examined and most of the species collected at the former meeting were found at the same stations, and in some instances in much greater abundance. Especially was this true of *Tofieldia glutinosa* of which only a single plant was found in 1898. It is now fairly plentiful together with *Rynchospora capillacea* var. *leviseta* and *Juncus alpinus* var. *insignis*.

Changes, however, have taken place along the Winslow shores of both the Kennebec and the Sebasticook rivers. The region known as "Beulah" is now a pasture and not at all the rich and attractive place that it was in former years.

Among the plants collected along the shore of the Kennebec may be mentioned *Rynchospora capillacea* var. *leviseta, Circaea intermedia, Juncus alpinus* var. *insignis, Tofieldia glutinosa, Solidago racemosa, Sporobolus Richardsonis;* new to the region, and plentiful. In woods were *Orchis spectabilis, Phegopteris hexagonoptera, Carex plantaginea, Dentaria diphylla, Dirca palustris* and *Caulophyllum*.

A public meeting was held on Wednesday evening in Coburn Classical Institute at which Prof. Webster Chester of Colby, in a very pleasing address, formally welcomed the Society to Waterville.

Mr. Frank S. Collins spoke on Marine Algae, illustrating his talk with an extensive series of finely prepared specimens; and Rev. A. B. Hervey told of collecting algae in Bermuda, with graphic descriptions of means and methods.

At a later meeting Mr. G. K. Merrill read a paper on Lichens, with especial reference to an important collection from Labrador.

The election of Officers resulted as follows:—

President, Mr. G. K. Merrill, Thomaston.
Vice-President, Mr. A. H. Norton, Portland.
Secretary, Dr. D. W. Fellows, Portland.
Treasurer, Mr. R. C. Bean, Clinton.

Committee of Arrangements,

Mr. G. K. Merrill, ex officio.
Dr. D. W. Fellows.
Mr. A. H. Norton.

The next meeting will be on the coast, probably in the neighborhood of Damariscotta.— D. W. Fellows, Secretary.

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